STATE OF NEW MEXICO
ENERGY, MINERALS, AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION TO CONSIDER:

CASE NO. 16308
ORDER NO. R-14796

APPLICATION OF MESQUITE SWD, INC. TO AMEND ADMINISTRATIVE ORDER SWD-1696 FOR A SALT WATER DISPOSAL WELL IN EDDY COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This case came on for hearing at 8:15 a.m. on July 12, 2018, at Santa Fe, New Mexico Examiner Michael A. McMillan.

NOW, on this 30th day of July 2018, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner,

FINDS THAT

(1) Due public notice has been given, and the Division has jurisdiction of this case and its subject matter.

(2) The applicant, Mesquite SWD, Inc. (OGRID 161968) ("Mesquite"), seeks to amend Administrative Order SWD-1696 to increase the allowed tapered tubing diameter in the proposed disposal well to a maximum of 7-inch inside the surface and intermediate casings and 5-1/2-inch inside the liner. Applicant further seeks to increase the maximum rate of water disposal to 40,000 barrels per day.

(3) Administrative Order SWD-1696 was issued October 20, 2017 allowing the Mesa Verde SWD Well No. 3 (API No. 30-015-44676) to be used for disposal of oil field produced water through an open hole interval within the Devonian and Silurian formations from approximate depths of 16620 feet to 17820 feet.

(4) Order SWD-1696 further specified the use of internally coated 5-1/2-inch or smaller tubing inside the surface and intermediate casings and 4-1/2-inch or smaller tubing inside the liner.

(5) The Mesa Verde SWD Well No. 3 has been drilled in a vertical direction at a surface hole location, 1030 feet from the South line and 2635 feet from the West line,

Unit N of Section 13, Township 24 South, Range 31 East, NMPM, Eddy County, New Mexico.

(6) Mesquite provided notice of this hearing to the Bureau of Land Management and to seven offsetting affected parties. Mesquite also posted notice in the Carlsbad daily newspaper listing the names of all affected parties. No other party entered an appearance in the case or otherwise opposed this application.

(7) Mesquite appeared at the hearing through counsel and presented evidence demonstrating the following.

(a) There have been four Devonian SWD wells permitted by the Division or Commission in this area of Eddy or Lea to use the 5-1/2-inch tubing inside 7-5/8-inch casing.

(b) The well has been drilled, cased, and cemented. Exhibit No. 3 shows the existing wellbore diagram with proposed tapered tubing configuration. The surface and first intermediate casing were shown on the diagram as circulated with cement. The 9-5/8-inch diameter, 53.5 pound-per-foot ("ppf"), P-110 BTC [second intermediate] casing was run to 12030 feet with the Wolfcamp top reported at 11993 feet. That casing has cement diverter tools ("DVT") at 7021 feet [approximate middle of Delaware Mountain Group] and 4570 feet [just above the Delaware Mountain Group] and is reported to have cement to surface. The 7-5/8-inch diameter, 39 pound-per-foot, ECP-110, J-2/STL flushed joint liner was run from 11457 feet to 16927 feet and circulated with cement.

(c) The target Devonian top as found on the mud log is at 16913 feet. The 6-1/2-inch diameter open hole extends from 16927 feet to 18032 feet. This interval is commonly called the "Devonian" in Southeastern New Mexico, but in this specific area, it consists primarily of Silurian and Late Ordovician aged carbonates.

(d) The Mesa Verde SWD Well No. 3 is located over one mile from the nearest existing or nearest currently-proposed Devonian SWD well. The Striker 2 SWD Well No. 1 (API No. 30-015-44416) is the nearest of these offsetting wells and is in Unit D of Section 23.

(e) The Mesa Verde SWD Well No. 3 is located over three miles from the nearest Devonian oil pool and west of the major fault zones located under the Central Basin Platform.

(f) Mesquite presented a predicted wellhead pressure vs injection rate plot with the requested tapered tubing configuration. The plot

included matched pressure vs rate behavior measured during a Step Rate Test for a smaller tapered tubing configuration on a separate well. The plot indicates the predicted behavior is relatively accurate using nodal analysis software. The requested 40,000 barrels of water per day is predicted to result in 1500 psi to 1700 psi of wellhead tubing pressure or less than a 0.1 psi/foot surface injection pressure gradient.

(g) The increase from currently permitted tubing sizes to the requested tubing sizes will likely yield an increase of 33 percent in disposal rate at the same tubing pressure and result in the need for fewer disposal wells.

(h) Disposing at the same rate, but through the larger sized tubing will reduce the friction and reduce the horsepower requirements over disposing through the tubing as currently permitted.

(i) Mesquite used a reservoir simulator with inputs of thickness, porosity, and permeability and predicts that the high KH of this reservoir will disperse the pore pressure much faster than if the reservoir was thinner and less permeable.

(j) Mesquite used a map published by the Texas Bureau of Economic Geology showing locations of PreCambrian aged faults then performed an analysis of fault slip potential ("FSP") with a range of assumed parameters and concluded the potential is small with the known PreCambrian aged fault located to the west having the highest potential.

(k) Mesquite also located all known seismic events since 1962 that are located within 25 kilometers of the Mesa Verde SWD Well No. 3 and plotted those on a map.

(l) Mesquite provided testimony and subsequently submitted written testimony from an experienced owner of a fishing tool company. This testimony indicated there is sufficient clearance in the proposed casing/tubing configuration to overshot tools, spear fishing, and (if needed) cutting tools.

The Division concludes as follows:

(8) The fishing specification books available to the Examiner indicate that the proposed 5-1/2-inch diameter tubing cannot be fished with an off-the-shelf slim-hole overshot inside 7-5/8-inch, 39-ppf casing. Therefore, the overshot tool required in this instance must be specially milled to a smaller outside diameter, resulting in lower tensile

strength rating. The evidence presented from an expert in pipe recovery indicates that the proposed tubing inside the subject well's casing can be fished [pulled out of the hole] with an internal spear type tool and can also be fished from the hole with a modified or milled overshot grapple.

(9) It is significant that an overshot grapple could be specially manufactured or milled and be used to catch the proposed 5-1/2-inch tubing within the existing 7-5/8-inch, 39-ppf casing. The ability to catch the outside and then enter the inside of the 5-1/2-inch tubing to cut and pull by sections would be an advantage that smaller tubing sizes may not allow. This ability to use an overshot and recover tubing in sections may reduce the cost of pipe recovery and allow the use of a more readily available drilling rig rather than a larger sized drilling rig and reduce fishing time and impact to the producing wells feeding into this disposal well.

(10) Mesquite indicated that other large capacity disposal wells in the area may take disposal waters on an interim basis during any necessary well work or unforeseen fishing operation.

(11) One of the requirements of the Division is that wells be properly plugged by the operator after the useful life of the well. The wellbore diagram and the well records indicate that the casing in this well is circulated with cement from bottom to top; although cement tops below each of the two cement diverter tools was not presented. The properly cemented well increases the likelihood that this well will someday be plugged properly, even if there were to be unrecovered tubing from abandoned fishing operations.

(12) The annular space using 5-1/2-inch steel tubing inside 7-5/8-inch steel casing should be adequate to hold a column of inert, noncorrosive fluid and to communicate induced pressures from the surface to the packer depths necessary to investigate the tubulars and to achieve a properly conducted mechanical integrity test.

(13) The proposed increase in tubing size in this properly cemented and cased disposal well should not pose an increased risk to potable or protectable waters and should not degrade the ability of the Division to properly administer the Class II Underground Injection Control program.

(14) Mesquite has used a recognized analytical stress/seismic model, input with assumptions as to reservoir characteristics and proximity to faults, to conclude that the expected seismic risks at this location and at this well density are still minimal at the larger, 40,000-barrel per day disposal rates. If in the future, seismic activity recorded within a 5-mile diameter radius distance from this well increases in frequency over previously recorded activity, then the Division will reserve jurisdiction to bring a compliance case pertaining to this well, including actions to restrict disposal rates or total disposal volume into this well to reduce such seismic activity.

(15) Reducing tubing friction by installing larger tubing will result in an increase in disposal rates but would not result in a higher allowed bottom hole pressure gradient than the default 0.65 psi per foot.

(16) Mesquite has shown for this deep, high capacity well at this location there are several compelling advantages of allowing the larger diameter tubing. Mesquite's application presents more advantages than risks and should be approved. Each such application of this sort should be evaluated on its merits.

(17) A requirement in Administrative Order No. SWD-1696 is to drill, log, and finalize the "as drilled" open hole disposal interval with the Division. The new permitted depths should reflect the completed well and should extend from 16927 feet to 18032 feet within Silurian and Ordovician aged rocks.

IT IS THEREFORE ORDERED THAT

(1) The application of Mesquite SWD, Inc., to amend Administrative Order No. SWD-1696 to allow tapered tubing sizes in the Mesa Verde SWD Well No. 3 (API No. 30-015-44676) disposal well comprised of 7-inch tubing inside the surface and intermediate casings and 5-1/2-inch inside the 7-5/8-inch liner is hereby approved.

(2) As per the application, SWD-1696 shall now reflect an allowed maximum disposal rate into this well of 40,000 barrels of waste water per day.

(3) Administrative Order No. SWD-1696 is amended to recognize the "as drilled" open hole disposal interval. The new permitted depths for disposal shall extend from 16927 feet to 18032 feet in Silurian and Ordovician aged rocks.

(4) All other provisions of Administrative Order No. SWD-1696 remain in full force and effect.

(5) If in the future, seismic activity recorded within a 5-mile diameter radius distance from this well increases in frequency over previously recorded activity, then the Division reserves the jurisdiction to bring a compliance case pertaining to this well including actions to restrict disposal rates or total disposal volume into this well to reduce such seismic activity.

(6) Jurisdiction is hereby retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

SEAL

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

HEATHER RILEY
Director